We claim:

1. A method of forming a raised solder mass used to electrically interconnect a first substrate to a second substrate in order to reduce current density for current flowing within such raised solder mass, the method comprising the steps of:

a. providing a first substrate, said first substrate having at least one electrical contact upon an upper surface thereof;

b. forming a solder bar upon the upper surface of said first substrate, the solder bar being electrically-coupled to the at least one electrical contact with for joining said at least one electrical contact to a second electrical contact on a second substrate, said step of forming the solder bar including the further steps of:

i. forming first and second generally circular solder pads each of a first predetermined diameter D upon the first substrate, each of the first and second generally circular solder pads having a center, and spacing the centers of the first and second generally circular solder pads at a predetermined spacing distance BL from each other;

ii. forming a bar pad of a first predetermined bar width BW upon the first substrate connecting the first circular solder pad to the second circular solder pad, the first predetermined bar width BW being less than the first predetermined diameter D;

iii. forming a predetermined solder bar volume VB over the first and second generally circular solder pads and over the bar pad, the solder bar volume VB reaching a height H1 above the centers of the first and second generally circular solder pads, and reaching a height H2 above a midpoint of the bar pad; and

iv. selecting predetermined diameter D, spacing distance BL, predetermined bar width BW and solder bar volume VB in such manner that H1 and H2 are approximately equal.

2. The method recited by claim 1 including the further step of forming conventional generally circular (as viewed from above) solder bumps upon the upper surface of the first substrate, the conventional generally circular solder bumps having a height H3, and wherein height H1 and height H2 of the solder bar are approximately equal to height H3.

3. The method recited by claim 2 wherein the conventional generally circular solder bumps have a particular solder pad diameter Dc, and wherein the diameter D of the first and second generally circular solder pads of the solder bar is in the range of from substantially Dc to substantially 2 times Dc.

4. The method recited by claim 2 wherein the conventional generally circular solder bumps have a particular solder bump volume Vc, and wherein the solder bar volume VB is in the range of from substantially 2 times Vc to substantially 5 times Vc.

5. The method recited by claim 1 wherein the volume of solder bar volume VB, the spacing distance BL, and bar width BW are preselected, and wherein the step of forming the solder bar includes the steps of:

a. selecting an initial value of diameter D;

b. computing values for H1 and H2 based upon the preselected values for VB, BL, BW, and the initial value for D;

c. reducing diameter D if the result of step b. is that H1 is greater than H2, and increasing diameter D if the result of step b. is that H1 is less than H2;

d. repeating steps b. and c. in an iterative process until the computed value of H1 becomes approximately equal to the computed value of H2; and

e. using the value for diameter D determined by step d. to form the first and second generally circular solder pads of the solder bar.

6. The method recited by claim 5 wherein computing step b. is performed by a computer running computer software that implements a regression algorithm.

7. The method recited by claim 1 wherein the diameter D, the spacing distance BL, and bar width BW are preselected, and wherein the step of forming the solder bar includes the steps of:

a. selecting an initial value of solder bar Volume VB;

b. computing values for H1 and H2 based upon the preselected values for D, BL, BW, and the initial value for VB;

c. changing solder bar volume VB, repeating step b., and determining whether such change in solder volume VB decreases the difference between the computed values for H1 and H2;

d. repeating steps b. and c. in an iterative process until the computed value of H1 becomes approximately equal to the computed value of H2; and

e. using the value for solder bar volume VB determined by step d. to form the solder bar.

8. The method recited by claim 7 wherein computing step b. is performed by a computer running computer software that implements a regression algorithm.

9. The method recited by claim 1 wherein the first substrate is a flip-chip integrated circuit.

10. The method recited by claim 1 wherein any difference between height H2 and height H1 is less than 10% of height H2.

11. The method recited by claim 10 wherein any difference between height H2 and height H1 is less than 5% of height H2.

12. The method recited by claim 1 wherein the diameter D, the spacing distance BL, and the solder bar volume VB are preselected, and wherein the step of forming the solder bar includes the steps of:

a. selecting an initial value of bar width BW;

b. computing values for H1 and H2 based upon the preselected values for D, BL, VB, and the initial value for BW;

c. reducing bar width BW if the result of step b. is that H1 is greater than H2, and increasing bar width BW if the result of step b. is that H1 is less than H2;

d. repeating steps b. and c. in an iterative process until the computed value of H1 becomes approximately equal to the computed value of H2; and

e. using the value for bar width BW determined by step d. to form the bar pad of the solder bar.

13. The method recited by claim 12 wherein computing step b. is performed by a computer running computer software that implements a regression algorithm.

14. The method recited by claim 1 wherein the diameter D, the bar width BW, and the solder bar volume VB are preselected, and wherein the step of forming the solder bar includes the steps of:

a. selecting an initial value of spacing distance BL;

b. computing values for H1 and H2 based upon the preselected values for D, BW, VB, and the initial value for BL;

c. increasing spacing distance BL if the result of step b. is that H1 is greater than H2, and decreasing spacing distance BL if the result of step b. is that H1 is less than H2;

d. repeating steps b. and c. in an iterative process until the computed value of H1 becomes approximately equal to the computed value of H2; and

e. using the value for spacing distance BL determined by step d. to form the bar pad of the solder bar.

15. The method recited by claim 14 wherein computing step b. is performed by a computer running computer software that implements a regression algorithm.

16. A solder bar formed upon an upper surface of a first substrate, the first substrate having a first electrical contact, said solder bar being adapted to join the first electrical contact to a second electrical contact on a second substrate, said solder bar comprising in combination:

a. a first generally circular solder pad formed upon the upper surface of the first substrate, the first generally circular solder pad having a center, and having a first predetermined diameter D;

b. a second generally circular solder pad formed upon the upper surface of the first substrate, the second generally circular solder pad having a center, and having said first predetermined diameter D, the center of said second generally circular solder pad being spaced from the center of said first generally circular solder pad by a predetermined spacing distance BL;

c. a solder bar pad of a first predetermined bar width BW formed upon the upper surface of the first substrate connecting said first circular solder pad to said second circular solder pad, the first predetermined bar width BW being less than the first predetermined diameter D;

d. a mass of solder having a solder bar volume VB formed over the first and second generally circular solder pads and over said solder bar pad to form said solder bar, the solder bar volume VB reaching a height H1 above the centers of said first and second generally circular solder pads, and reaching a height H2 above a midpoint of said solder bar pad;

e. wherein the values for predetermined diameter D, spacing distance BL, predetermined bar width BW, and solder bar volume VB are selected in such manner that H1 and H2 are approximately equal.

17. The apparatus recited by claim 16 wherein conventional generally circular (as viewed from above) solder bumps are also formed upon the upper surface of the first substrate, the conventional generally circular solder bumps having a height H3, and wherein height H1 and height H2 of said solder bar are approximately equal to height H3.

18. The apparatus recited by claim 17 wherein the conventional generally circular solder bumps have a particular solder pad diameter Dc, and wherein the diameter D of said first and second generally circular solder pads of said solder bar is in the range of from substantially Dc to substantially 2 times Dc.

19. The apparatus recited by claim 17 wherein the conventional generally circular solder bumps have a particular solder bump volume Vc, and wherein the solder bar volume VB is in the range of from substantially 2 times Vc to substantially 5 times Vc.

20. The apparatus recited by claim 16 wherein said first substrate is a flip-chip integrated circuit.

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21. The apparatus recited by claim 16 wherein any difference between height H2 and height H1 is less than 10% of height H2.

22. The apparatus recited by claim 16 wherein any difference between height H2 and height H1 is less than 5% of height H2.